

Detection of Endosulfan Residues in the Soil of Western Jordan Valley

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ABSTRACT

Soil samples were collected from ten different locations of the Western Jordan Valley (W. J. V.) extending from Pardala (north) to Jericho city (south). The residues of Endosulfan which is the most widely used insecticides in the W. J. V. were detected using Gas Chromatography/ Mass Spectrometry (GC/ MS). The soil samples were collected from two depth levels namely 0-30 and 30-60 cm. The correlation between the quantity of the pesticide residues and the soil depth were determined. Results show that the mean values of Endosulfan residues in the southern part of W. J. V. were significantly higher than those of the northern part. Moreover, for the same location, the mean values of the residues in the samples taken from the soil depth of 0-30 cm were significantly higher than those at 30-60 cm. Comparison of the total mean values of Endosulfan residues obtained from the soils of W. J. V. with those obtained by other investigators from other countries show that the Western Jordan Valley has higher levels, so that it is recommended to reduce the concentration and frequency of Endosulfan applications.

KEYWORDS: Endosulfan, Thionex[®], Soil Residues, Gas Chromatography/ Mass Spectrometry.

1. INTRODUCTION

The Jordan Valley is considered the most important agricultural area between Jordan, Palestine and Israel where many important crops are grown. Many agricultural insect pests and diseases attack cultivated crops in this region, so that huge quantities of pesticides are yearly applied to control these insect pests and diseases.

Endosulfan (sold as Thionex[®], EC containing 35 g/L)

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is used frequently by the Palestinian farmers in the Western Jordan Valley (W. J. V.) to control the following insect pests: whiteflies, aphids and red spidersmites. In other countries, Endosulfan is used to control other insect pests such as thrips, foliage feeding larvae, cutting worms, plant bugs, leafhoppers on citrus orchards and deciduous small fruit trees, coffee, tea, fiber crops, ornamentals, tobacco and vegetables, in addition to being used as wood preservative against wood decaying insects (Carey and Douglas, 1971; Goebel et al., 1982).

Jayakumar (2000) has determined the residues of Endosulfan in three types of soil by gas chromatographic method of analysis. The residual amounts of α - and β -endosulfan were found to be between 1.53 and 3.0 mg/kg for α -endosulfan and between 2.64 and 34.36 mg/kg for β -endosulfan depending on the soil type. This indicates that the soil samples, in relation to their type, have a moderate capacity to adsorb Endosulfan. Kimber et al.